A Gulf Publishing Company Publication

THE REFINER
and Natural Gasoline Manufacturer

Member Audit Bureau of Circulations

VOL. 9, No. 9 — SEPTEMBER, 1930

GRADY TRIPLETT, Editor — GEORGE REID, Associate Editor

TABLE OF CONTENTS

EDITED MONTHLY AT TULSA, OKLAHOMA

Published Monthly
by
GULF PUBLISHING COMPANY
OFFICE OF PUBLICATION
3301 Buffalo Drive, Houston, Texas

R. L. DUDLEY, *President*
A. L. BURNS, *Gen'l Manager*
SPENCER W. ROBINSON, *Editorial Director*
J. KENT RIDLEY, *Managing Editor*

NEW YORK: Room 613, 250 Park Avenue
Dick Swinsky, Manager.

PITTSBURGH: 703 Park Bldg., W. W. Pigue, Manager.

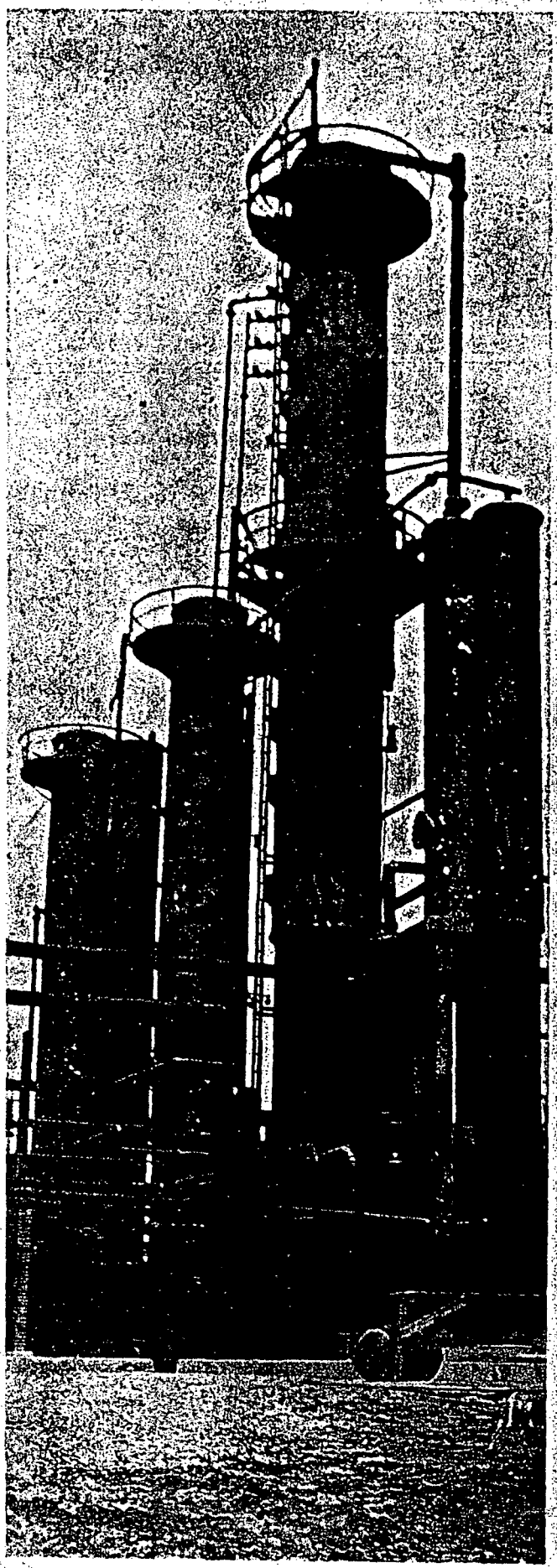
CHICAGO: Room 624 S. Michigan Ave., O. R. Waller, Manager.

LOS ANGELES: 416-417 Haas Bldg., W. E Green, Manager.

TULSA: 913-916 Hunt Bldg., J. F. Carter, Jr., Manager.

FORT WORTH: 203 W. T. Waggoner Bldg., H. H. King, Manager.

Single copies 20 cents. Domestic and Foreign subscription price, $1.00 a year. Advertising rates on application.



Wilcox Ha... Installation ... Plant...

WILCOX OIL & GAS COMPANY has ... operating its new refinery at Bristow, Okla., a little more than a year, during which ... certain additions and changes have been made ... secure products not originally required and to ... erally improve efficiency. The refinery is on the same site as the original 1000-barrel Wilcox experimental plant erected 10 years ago, which was ... ated under lease by Riley Petroleum Company ... 1928, and which was completely dismantled to ... erection of the new 4000-barrel modern skimming ... cracking plant. Decision to erect and operate a ... finery follows entry of the company into wholesale and retail marketing and subsequent expansion of these facilities in territory within a radius of ... miles of the refinery. Like most modern installations of the type this plant consists of skimming plant, cracking unit, and redistillation battery, with vapor recovery system and continuous treating equipment.

The greater portion of the 4000-barrel crude ... quirements of the refinery is produced locally by the company, and as soon as it is practical the crude is brought direct to the plant from the field, thus eliminating expensive storage and handling facilities. However, this practice is conducive to relatively high percentages of b. s. & w. in the crude, which must be settled out before actual processing at high temperature. This is accomplished by means of ... heating the fresh crude in a series of Cloverleaf ...

Cloverleaf Sections

Fractionating equipment in connection with crude topping unit and pressure distillate re-run stills.

Ha Modern
tio n Bristow
lan

By GEORGE REID
Associate Editor

placed
d in the uppermost section of the skimming unit
fractionating
ating column where the oil is preheated to
heat
00° F.

m this point the crude passes into one end of
ght by 24 foot horizontal settling drum (for-
merly
having seen years of service as a shell still)
where
the settling time is sufficient to let the foreign
materials
als drop out of the oil. Clean crude is drawn
continuously
ously from the front and top of the drum, and
& w. is continuously removed from the front
ottom of the settler.

crude is then further preheated through coun-
through a series of exchangers, absorbing
om the residum leaving the base of the sepa-
for
column. The temperature is raised to about
F. before it enters the pipe still. This Winkler
distillation unit consists of 124 tubes 3½
I. D. and 22 feet long, arranged in two con-
vection
banks and one roof bank. As the oil leaves
the
tubes it has been heated to about 520° F. and
this
temperature it enters the bottom of the large
fractionating
ating column.

column was designed by the same engineering
rm, and is six feet in diameter by 75 feet high.
ains 17 bubble decks and two blank decks,
which is approximately half way up the height
the
tower from which point a kerosene side stream
gas
oil is removed; the other blank deck being just
below
the top three bubble trays where a side stream
oline is removed. Former design called for

By means of this conveyor coke dropping from the reaction chamber is loaded directly into cars for shipment.

removal of a kerosene side stream into a flashing or stripper tower, and withdrawal of residuum through a similar flash tower, flashing both with superheated steam, and returning flashed vapors to the original column. Under the present practice the upper auxiliary tower or side stream produces a stream of 437 e. p. naphtha, and a 375 e. p. gasoline stream is taken off over head. Gas oil may be removed from the lower withdrawal equipment, and fuel oil is taken from the bottom. Condensed 375 e. p. gasoline is taken from a large water separator device and returned over the top of the column as a means of temperature control. This control is also aided by passing the incoming crude through the coils in the top of the tower. Residue is pumped from the tower by liquid level control into raw oil tanks for the Dubbs unit.

This change in design and in the number and type of products fractionated through the large bubble column is an example of the flexibility of modern rectifying equipment. With slight mechanical changes the operation of the tower may at any time be converted back to the original system or to meet some other requirements. The two grades of gasoline produced in this operation are given sodium plumbite treatment in a continuous treating system to meet Doctor and corrosion specifications.

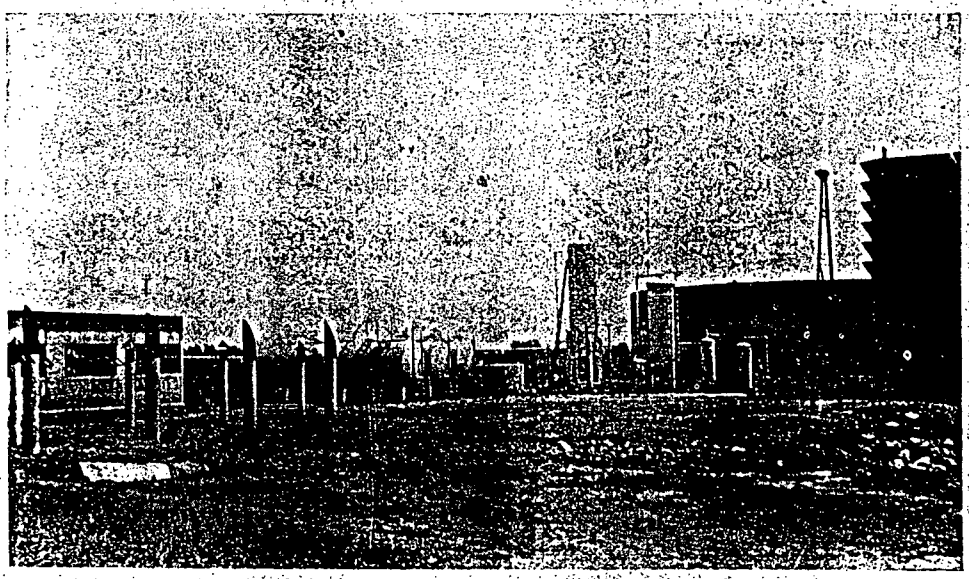
CRACKING OPERATION

The Dubbs cracking unit is equipped with a 10 by 40 foot reaction chamber and late type modified Alcorn radiant heat furnace. Several changes in design were effected in this furnace and its operation. Special alloy beams have been installed to support the radiant shield getting the weight off of the tubes, the arch was removed, the number of tubes was reduced to 64 and the flow of oil was reversed. These changes and other details were worked out by Dubbs, Alcorn and Wilcox engineers, due to the new design of the furnace. The unit is operated in three day cycle running non-residuum. At present the production of topped crude is in excess of the capacity of the single Dubbs unit, and the company is considering the installation of additional cracking equipment.

Through the use of equipment designed for direct loading of coke into cars the coke production is handled but once at this plant. A spur track was built close to the reaction chamber from the nearby railroad. A conveyor with a hopper large enough to fit under the reaction chamber, is employed to dump the coke directly into the cars. As the 4300-foot cable is pulled from the chamber by means of a steam hoist, the electrically operated conveyor removes the falling coke, free of nuts, bolts, dirt and other foreign matter, spilling it into the cars. It is estimated that this conveyor has reduced the cost of handling coke about one dollar per ton, and as seven to eight hundred tons are handled monthly and sold on contract to a large industrial concern, there is real economy effected in this method of handling the product.

Pressure distillate from the cracking operation is taken to the treating department and treated with four pounds of 66° Be. acid per barrel and neutralized with 17° Be. caustic in a continuous system. The distillate is then taken to rerun stills. This system consists of two 12 by 30 foot shell stills equipped with bubble towers. Incoming 50 gravity pressure distillate is charged through Cloverleaf sections placed in the tops of the two bubble towers. After this preheating it enters the shell stills. Through the addition of a new stripper tower in connection with the second bubble tower, the rerun system is producing a fraction of stripped furnace oil of about 34 gravity. The bottoms are marketed as 28/30 gravity fuel oil. Overhead stream from the fractionating equipment is a premium grade 400 end point anti-knock motor fuel and marketed as such. A side stream of 425 end point gasoline is removed which is blended with the straight run gasoline.

Cracked gasoline from the rerun operation is given Doctor treatment in a continuous system. The straight run gasolines are given similar treatment. Two complete continuous



Compression gasoline recovery plant and gas washing equipment

(Continued on page 122)

Reference 5

to guard against loss of desirable fractions. Both the raw gasoline and reflux feeds is regulated by Foxboro controllers, the usual orifice arrangement being maintained.

The re-boiler and column temperatures are maintained within one-half of one degree of the desired temperature, the success of the stabilization depending largely upon this small deviation from the ideal temperature. The pressure on the stabilizing column is maintained within one-half pound of the desired pressure.

The regulator is on the water condensate from the re-boiler. Boiler pressure is maintained on the re-boiler, while the desired temperature is maintained by a half-inch regulator installed on the water condensate leaving the re-boiler. When the valve is closed, water covers the tube section, and when the valve is opened, water leaves the tower, allowing steam to cover the tube section and thereby increasing the temperature.

Liberal use of concrete for supporting such equipment as the heat exchangers and condensers add strength to the installation and reduces the fire hazard. Elimination of buckling from steel platforms is also accomplished, in addition to a more attractive appearance. The ladder leading up the main column is enclosed by a barrel of heavy wire netting—an added safety factor for workmen.

Five large DeLaval centrifugal pumps are used for circulating water and moving the gasoline, two being for the former and three for the latter. All pumps are in a pit below the surface of the ground. The pump house is equipped with blowers to prevent accumulation of dangerous fumes.

The unit was designed and built by C. F. Braun and Company; actual arrangement of the equipment being largely in the hands of company engineers. Besides handling an almost unprecedented gallonage, the unit is one of the most attractive installations yet completed.

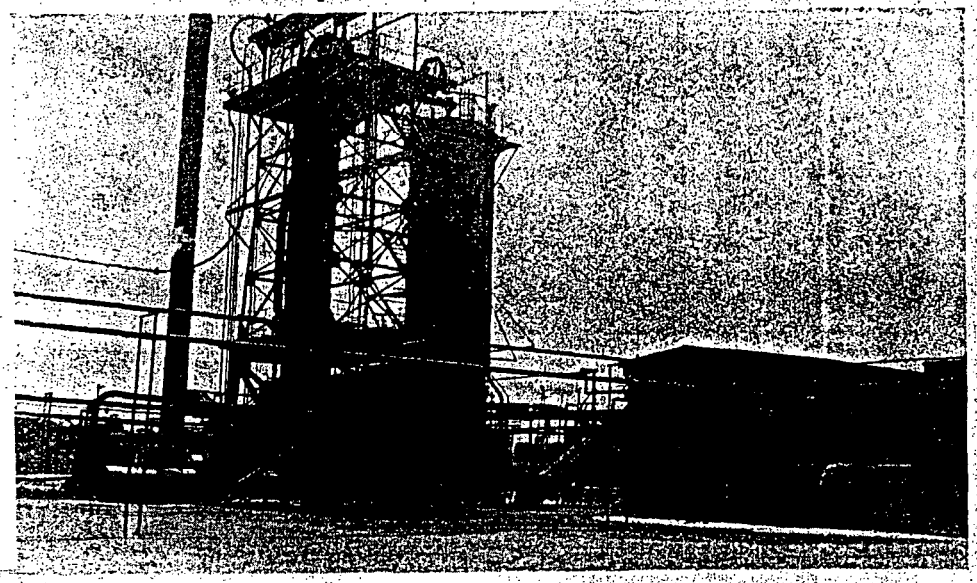
Wilcox Has Modern Installation in Bristow Plant

(*Continued from page 74*)

treating systems are provided for handling the light products, and agitators of the batch type were erected for kerosene treatment.

A recent addition at this plant is a compression type gasoline recovery installation for which gases and vapors are gathered from the skimming plant receiving house, the redistillation plant receiving house, light product storage and crude tanks. Yields from these vapors run from two to six gallons per 1000 cubic feet. The plant production ranges from 4000 to 5000 gallons per day. Gases from the Dubbs unit operation are to be processed through an absorption type recovery unit planned for early installation. Vapors from the pressure distillate rerun operation are first scrubbed through alkaline solution before they are compressed.

The compression plant consists of four 80-horsepower Bessemer machines operating at 40 pounds on the low stage side and 175 pounds on the high stage side.



Cracking equipment at Wilcox Oil & Gas Company's Bristow, Oklahoma, refinery

Early in the construction of the new refinery P. L. Tinkler joined the organization as construction engineer. He supervised the installation and design of facilities, and upon completion of the plant was made superintendent of its operation, and has directed the modifications and additions to the plant as discussed in this writing. We are indebted to Mr. Tinkler for his helpfulness and his permission to present the details of plant operations.